Spatiotemporal brain dynamics supporting the immediate automatization of inhibitory control by implementation intentions

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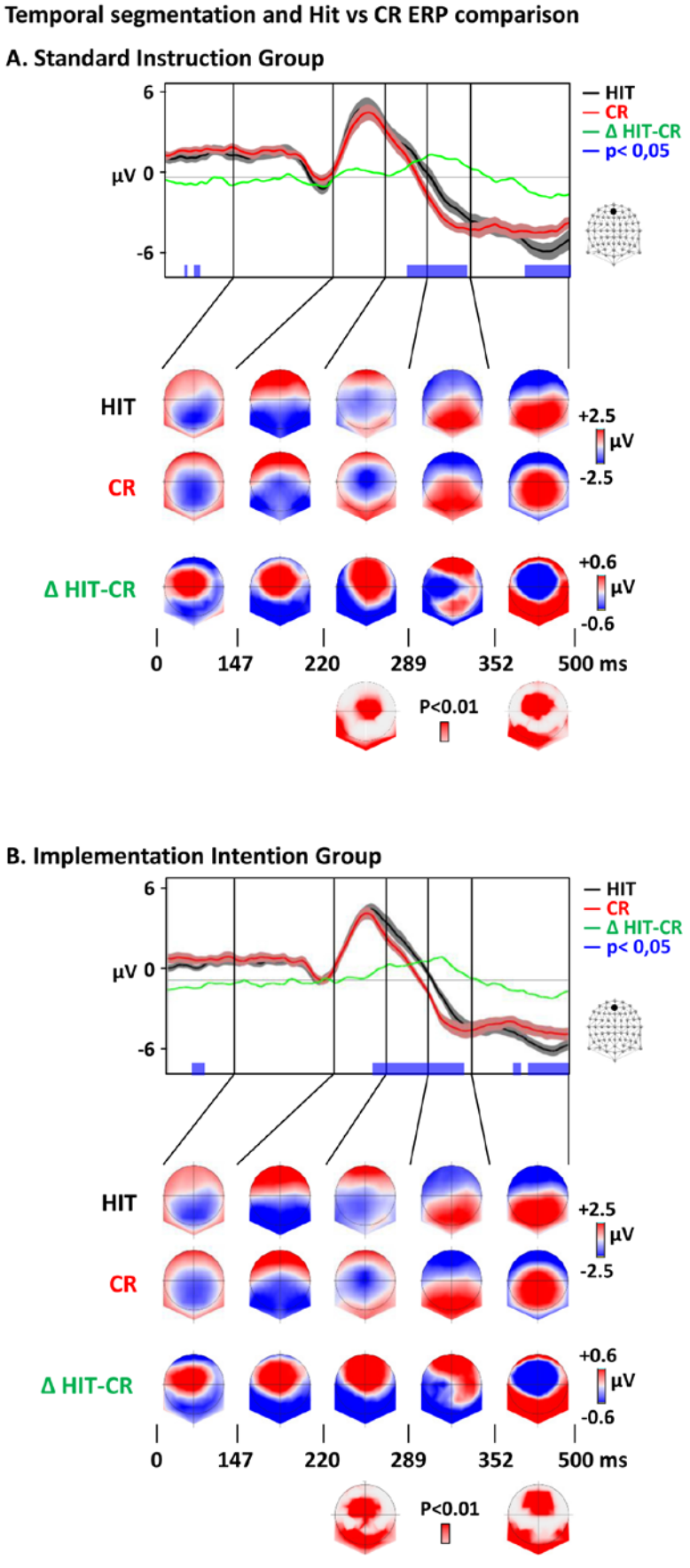
Supplementary information

Supplementary Figure 1



Supplementary Figure 1:

In order to examine if our experimental paradigm successfully elicited the typical N2 and P3 inhibition-related ERP components, we submitted the group-averaged ERP data to a hierarchical clustering based on an atomize and agglomerate approach (Brunet 2011; Murray 2008; Michel 2009). This approach is based on evidence that the ERP map topography does not vary randomly across time, but remains quasi-stable over 20-100 msec functional microstates -i.e. the ERP components- before rapidly switching to other stable periods (Lehmann and Skrandies, 1980; Pascual-Marqui 1995; Cacioppo 2014). As in previous literature based on this approach (e.g. Fargier 2016; Maitre 2017; Laganaro 2012), the optimal number of clusters that explained the best the grand-average data sets across conditions was identified using a modified version of the cross validation criterion combining a cross-validation criterion and the Krzanovski-Lai criterion (Tibshirani et al., 2005; see Murray 2008). This analysis enabled identifying the series of ERP component in our data in a data-driven manner. The clustering analysis revealed 5 time windows comprising distinct ERP components (0-147 ms; 148-220 ms; 221-289 ms; 290-352 ms; 353-500 ms). The timing and the topography of these components corresponded to the typical sequence of components observed in visual Go/NoGo tasks. We report the ERP topographies of the identified ERP components for the Go (Hit) and NoGo (Correct rejection) for each of these components and for the SI and II groups separately, as well as the topography of the difference between the components in the Hit-CR condition. We also report the group-averaged waveforms at an exemplar electrode within the cluster showing the significant interaction and the t- and p- values of the Hit vs CR t-tests over time.

This analysis confirms the presence of a N2 and P3 components (with negative fronto-central topography ca. 220 -330ms and a positive central topography 330-500ms, respectively, cf e.g. Falkenstein 1999), and that our interaction effect takes place at the beginning of the N2 component (i.e. during a period of stable topography).

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Supplementary Figure 2 : Experimental design : Stimuli across blocks

Block "A"		Block "E"		Block "O"		Block "blue"		Block "green"		Block "red"	
Go	NoGo	Go	NoGo	Go	NoGo	Go	NoGo	Go	NoGo	Go	NoGo
E	A	A	E	A	O	A	A	A	A	A	A
E	A	A	E	A	O	E	E	E	E	E	E
E	A	A	E	A	O	O	O	O	O	O	O
O		O		E		A		A		A	
O		O		E		E		E		E	
O		O		E		O		O		O	

Supplementary figure 2

Table illustrating the six types of block and their stimuli. "Block "A"" for example means that the NoGo was the A letter irrespective of the color. The blocks were presented in a randomized order to the participants during the session. Each block was presented two times in a row, and then two different blocks were presented etc.